IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	T. KUTSUNA, et al.
Serial No.:	10/602,637
Filed:	JUNE 25, 2003
Title:	FUEL SYSTEM HAVING EXCELLENT GASOLINE BARRIER PROPERTY
Group AU:	1794
Examiner:	Marc A. Patterson
Confirm. No.:	1073

RESPONSE TO NOTIFICATION OF NON-COMPLIANT APPEAL BRIEF

Mail Stop: APPEALS
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

July 20, 2009

SIR:

In response to the Notification of Non-compliant Appeal Brief mailed June 19, 2009, Applicants respectfully submit herewith a new EVIDENCE APPENDIX for the above-identified application. On the first page of this EVIDENCE APPENDIX, is included a listing of the evidence submitted, indicating when the evidence was entered in the record. Also enclosed as part of this EVIDENCE APPENDIX is the evidence submitted.

The indication in the Notification mailed June 19, 2009, that the entire Brief is not required, only the section found defective is required, is noted. Accordingly, attached herewith is only the EVIDENCE APPENDIX, containing the aforementioned listing and the evidence itself.

In view of the foregoing, it is respectfully submitted that any non-compliance in the Appeal Brief submitted June 10, 2009, set forth in the Notification mailed June 19, 2009, has been corrected. Further prosecution of the above-identified

application, based upon the corrected Appeal Brief submitted on June 10, 2009, with EVIDENCE APPENDIX enclosed herewith, is respectfully requested.

Applicants request any shortage in fees due in connection with the filing of this paper be charged to the Deposit Account of Antonelli, Terry, Stout & Kraus, LLP, Deposit Account No. 01-2135 (case 396.42795X00), and credit any excess payment of fees to such Deposit Account.

Respectfully submitted,

ANTONELLI, TERRY, STOUT & KRAUS, LLP

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EVIDENCE APPENDIX

Listing of Evidence Submitted:

1. Pages 43-50 of Appellants' specification; entered in the record upon originally filing Application No. 10/602,637 on June 25, 2003.
2. Declaration Under 37 C.F.R. 1.132, executed by Shinichi Yonehama on August 11, 2008, entered in the record in Application No. 10/602,637 on September 2, 2008.

the tube body; DFT is a thickness (mm) of the coating layer; and P is a gasoline permeability coefficient ($g \cdot mm/m^2 \cdot day$) of the coating layer.

(3) Gasoline permeability of the tube after bending treatment (10 times) (Examples 4 to 8 and Comparative Examples 2 to 4)

A test piece (length: 500 mm, inner diameter: 24 mm and thickness: 5 mm) obtained from the tube prepared was subjected 10 times to bending treatment. After the treatment, the gasoline permeability coefficient ($g \cdot mm/m^2 \cdot day$) was determined by the same method as the method for evaluating a gasoline permeability coefficient of the untreated product.

Example 1

Prepared was a methanol/ethyl acetate = 1 : 1 solution (solid matter concentration: 30 % by weight) containing 44 parts by weight of the epoxy resin curing agent A and 50 parts by weight of an epoxy resin having a glycidylamine part derived from metaxylylenediamine (TETRAD-X, manufactured by Mitsubishi Gas Chemical Co., Ltd.), and 0.02 part by weight of an acryl base wetting agent (BYK381, manufactured by Bic Chemie Co., Ltd.) and stirred well to obtain a coating liquid. This coating liquid

was coated on high density polyethylene (HDPE) having a thickness of 100 μm by means of a bar coater No. 24 and dried at 120°C for 10 minutes, and then it was further cured at 180°C for 10 minutes, whereby a coated film was obtained. The coating layer had a thickness of 10 μ m. A gasoline permeability coefficient of the coated film thus obtained was determined. The result thereof is shown in Table 1. The skeletal structure represented by Formula (1) contained in the above coating layer accounted for 54.1 % by weight.

Example 2

A coated film was prepared and evaluated by the same methods as in Example 1, except that 72 parts by weight of the epoxy resin curing agent B was substituted for the epoxy resin curing agent A. The result thereof is shown in Table 1. The skeletal structure represented by Formula (1) contained in the coating layer accounted for 56.5 % by weight.

Example 3

A coated film was prepared and evaluated by the same methods as in Example 1, except that 78 parts by weight of the epoxy resin curing agent C was

substituted for the epoxy resin curing agent A. The result thereof is shown in Table 1. The skeletal structure represented by Formula (1) contained in the coating layer accounted for 56.9 % by weight.

Comparative Example 1

A film of 100 μ m comprising EVOH (ethylene content: 32 mole %, saponification: 99.6 %) was evaluated for a gasoline permeability coefficient. The result thereof is shown in Table 1.

Table 1

	Gasoline permeability coefficient ($g \cdot mm/m^2 \cdot day$)
Example 1	0.006
Example 2	0.006
Example 3	0.004
Comparative Example 1	0.20

Example 4

An acrylonitrile-butadiene rubber was molded into a tube having an inner diameter of 24 mm and a thickness of 5 mm, and this was cut to a length of 500 mm to obtain a tube body. Prepared was a methanol/ethyl acetate = 1 : 1 solution (solid matter concentration: 30 % by weight) containing 50 parts by

weight of the epoxy resin having a glycidylamine part derived from metaxylylenediamine (TETRAD-X, manufactured by Mitsubishi Gas Chemical Co., Ltd.) and 115 parts by weight of the epoxy resin curing agent A, and 0.02 part by weight of the acryl base wetting agent (BYK381, manufactured by Bic Chemie Co., Ltd.) and stirred well to obtain a resin solution. One end face of the tube body described above was sealed with an aluminum matter (aluminum-deposited film), and this resin solution was filled into the tube body and immediately discharged, whereby the resin solution was coated onto the inner face of the tube body. After discharging the resin solution, the aluminum matter was detached from the end face of the tube body, and the resin solution was cured at 80°C for 10 minutes and then at 120°C for 15 minutes to form a coating layer. The coating layer had a thickness of 10 μm. The tube in which the coating layer was formed was evaluated for a gasoline barrier property and a gasoline barrier property after bending (a gasoline permeability coefficient of the coating layer, a gasoline permeability of the tube and a gasoline permeability of the tube after the bending treatment (10 times)). The results thereof are shown in Table 2. The skeletal structure

represented by Formula (1) contained in the above coating layer accounted for 61.4 % by weight.

Example 5

A tube was prepared by the same method as in Example 4, except that 132 parts by weight of the epoxy resin curing agent B was substituted for the epoxy resin curing agent A, and the gasoline barrier property and the gasoline barrier property after bending were evaluated. The results thereof are shown in Table 2. The skeletal structure represented by Formula (1) contained in the above coating layer accounted for 59.3 % by weight.

Example 6

A tube was prepared by the same method as in Example 4, except that 163 parts by weight of the epoxy resin curing agent C was substituted for the epoxy resin curing agent A, and the gasoline barrier property and the gasoline barrier property after bending were evaluated. The results thereof are shown in Table 2. The skeletal structure represented by Formula (1) contained in the above coating layer accounted for 60.5 % by weight.

Example 7

A tube was prepared by the same method as in Example 4, except that 110 parts by weight of the epoxy resin curing agent D was substituted for the epoxy resin curing agent A, and the gasoline barrier property and the gasoline barrier property after bending were evaluated. The results thereof are shown in Table 2. The skeletal structure represented by Formula (1) contained in the above coating layer accounted for 66.5 % by weight.

Example 8

A tube was prepared by the same method as in Example 4, except that 140 parts by weight of the epoxy resin curing agent E was substituted for the epoxy resin curing agent A, and the gasoline barrier property and the gasoline barrier property after bending were evaluated. The results thereof are shown in Table 2. The skeletal structure represented by Formula (1) contained in the above coating layer accounted for 59.4 % by weight.

Comparative Example 2

A nylon-12 resin was used as a barrier resin layer, and an acrylonitrile-butadiene rubber was used

as an external layer to mold them into a tube having an inner diameter of 24 mm, a thickness of 0.1 mm in the barrier resin layer and a thickness of 5 mm in the external layer by means of an injection molding machine. This tube was cut to a length of 500 mm, and the gasoline barrier property and the gasoline barrier property after bending were evaluated. The result thereof is shown in Table 2.

Comparative Example 3

A tube was prepared by the same method as in Comparative Example 2, except that a copolymer resin of vinylidene fluoride, propylene hexafluoride and ethylene tetrafluoride was used as the barrier resin layer, and the gasoline barrier property and the gasoline barrier property after bending were evaluated. The result thereof is shown in Table 2.

Comparative Example 4

A tube was prepared by the same method as in Example 4, except that 33 parts by weight of the epoxy resin curing agent F was substituted for the epoxy resin curing agent A, and the gasoline barrier property and the gasoline barrier property after bending were evaluated. The result thereof is shown

in Table 2.

Table 2

	Gasoline permeability coefficient of coating layer ($g \cdot mm/m^2 \cdot day$)	Gasoline permeability of tube ($g/m^2 \cdot day$)	Gasoline permeability of tube after bending ($g/m^2 \cdot day$)
Example 4	0.010	1.0	1.1
Example 5	0.009	0.9	1.0
Example 6	0.009	0.9	1.0
Example 7	0.012	1.2	1.2
Example 8	0.010	1.0	1.1
Comparative Example 2	-	150	150
Comparative Example 3	-	14	100
Comparative Example 4	0.015	1.5	10

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : TAKAAKI KUTSUNA, ET. AL.
Serial No. : 10/9602,637
Filed : June 25, 2003
For : FUEL SYSTEM HAVING EXCELLENT GASOLINE BARRIER PROPERTY
Art Unit & Examiner: 1794, PATTERSON, MARC A

DECLARATION UNDER 37 C.F.R. 1.132

Honorable Commissioner of Patents and Trademarks
Washington, D.C. 20231

Sir:

Now comes Shinichi YONEHAMA who deposes and states:

1. That I am a graduate of Kanazawa University and (received master degree of Engineering in the year of 1993.)
2. That I have been employed by Mitsubishi Gas Chemical Company Inc. of 5-2, Marunouchi 2-chome, Chiyoda-ku, Tokyo 100-8324, Japan for years since 1993 as a researcher in the field of Polymer.
3. That I have a good knowledge of the English language and have read and understood the application papers and the Examiner's Official Action as well as the reference cited therein in the prosecution of the above identified patent application; and
4. The following experiments were carried out by me.

Additional Comparative Examples

1. Curing agent of Tashiro et al was prepared according to Example 1 of US3,704,229.

2. Additional Comparative Example 1

Prepared was a methanol/ethyl acetate = 1 : 1 solution (solid matter

concentration: 30 % by weight) containing 40 parts by weight of the above curing agent and 60 parts by weight of an epoxy resin Epikote 828 (Shell) and stirred well to obtain a coating liquid. This coating liquid was coated on high density polyethylene (HDPE) having a thickness of 100 μm by means of a bar coater No. 24 and dried at 120°C for 10 minutes, and then it was further cured at 180°C for 10 minutes, whereby a coated film was obtained. The coating layer had a thickness of 10 μm. A gasoline permeability coefficient of the coated film thus obtained was determined. The result thereof is shown in Table A.

3. Additional Comparative Example 2

According to Example 4, an acrylonitrile-butadiene rubber was molded into a tube having an inner diameter of 24 mm and a thickness of 5 mm, and this was cut to a length of 500 mm to obtain a tube body.

Prepared was a methanol/ethyl acetate = 1 : 1 solution (solid matter concentration: 30 % by weight) containing 40 parts by weight of the above curing agent and 60 parts by weight of an epoxy resin Epikote 828 (Shell) and stirred well to obtain a resin solution.

One end face of the tube body described above was sealed with an aluminum matter (aluminum-deposited film), and the resin solution was filled into the tube body and immediately discharged, whereby the resin solution was coated onto the inner face of the tube body. After discharging the resin solution, the aluminum matter was detached from the end face of the tube body, and the resin solution was cured at 80°C for 10 minutes and

then at 120°C for 10 minutes to form a coating layer. The coating layer had a thickness of 10 μm. The tube in which the coating layer was formed was evaluated for a gasoline barrier property and a gasoline barrier property after bending (a gasoline permeability coefficient of the coating layer, a gasoline permeability of the tube and a gasoline permeability of the tube after the bending treatment (10 times)). The results thereof are shown in Table A.

Table A

Comparison of results of Additional Comparative Examples with those of Example 1 and 4 of the present invention

	thickness of coating layer	Gasoline permeability coefficient	Gasoline permeability coefficient of layer	Gasoline permeability of tube	Gasoline permeability of tube after bending
	μm	g·mm/m²·day	g·mm/m²·day	g/m2·day	g/m2·day
Example 1	10	0.006			
Example 4	10		0.010	1.0	1.1
Additional Comparative Example 1	10	0.25			
Additional Comparative Example 2	10		0.42	33	94

I declare further that all statements made herein of my own

knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Shinichi Yonehama
Shinichi YONEHAMA

August 11, 2008
Date